



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/735,210	12/15/2003	Kazuhisa Takagi	402907	1815
23548	7590	10/19/2005		
LEYDIG VOIT & MAYER, LTD 700 THIRTEENTH ST. NW SUITE 300 WASHINGTON, DC 20005-3960			EXAMINER LEE, JOHN D	
			ART UNIT 2874	PAPER NUMBER

DATE MAILED: 10/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

28

<b>Office Action Summary</b>	<b>Application No.</b> 10/735,210	<b>Applicant(s)</b> TAKAGI, KAZUHISA	
	<b>Examiner</b> John D. Lee	<b>Art Unit</b> 2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-11 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 10 is/are rejected.
- 7) ☒ Claim(s) 8,9 and 11 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>1203</u> . | 6) <input type="checkbox"/> Other: ____.  |

Acknowledgement is made of a claim for foreign priority under 35 U.S.C. §§ 119

(a)-(d) or (f). All of the certified copies of the priority documents have been received.

The five (5) sheets of drawings filed in this application are acceptable.

The disclosure has not been studied to the extent necessary to discover all possible minor errors therein. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim 1 is objected to because of the following minor informality. Appropriate correction is required. The Examiner doesn't understand the insertion of the word "of" in line 7 of claim 1 via the preliminary amendment. The insertion of this word makes no sense grammatically. Appropriate correction is required.

The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3 and 10 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 6,282,015 to Ueno et al. Ueno et al discloses, with respect to the prior art in Figure 1A thereof, the presence of an optical wavelength converter comprising essentially all the same elements as applicant's claimed converter. The prior art wavelength converter comprises an input-light splitter 27 for splitting an input phase-modulated light signal pulse at a first wavelength  $\lambda_1$  into first and second split light (light paths 28 and 29); a continuous-wave light source (such as an injection laser diode) 21 at a second wavelength  $\lambda_2$  into which is also split (at 23) into first and second split light; a Mach-Zehnder interferometer containing nonlinear portions 24 and 25, one in each arm

Art Unit: 2874

of the interferometer; and an output coupler **30** for outputting an output phase-modulated light signal pulse at the second wavelength  $\lambda_2$ . Although the description in Ueno et al does not use the same terminology set forth in applicant's claims, the person of ordinary skill in the art would obviously have known and understood that the Mach-Zehnder interferometer of the prior art wavelength converter operates as a "multiplex interference element" to multiplex-interfere the first and second split lights (both from the input signal pulse and from the continuous-wave light source). The person of ordinary skill in the art would further have known and understood that the Mach-Zehnder interferometer of the prior art wavelength converter (because of the non-linear elements in the arms thereof) performs a cross-phase modulation of the continuous-wave light at wavelength  $\lambda_2$  and the signal pulse light at wavelength  $\lambda_1$ ). The output signal pulse is thus a phase-modulated pulse like that of the input signal pulse but at a converted wavelength  $\lambda_2$ . The optical wavelength converter of the above-identified claims would therefore have been obvious over that of Ueno et al Figure 1A since, as just explained, the Mach-Zehnder interferometer of the reference is equivalent to the claimed "multiplex-interference portion" and "phase modulation portion" broadly stated in the claims. Notice also that, in Ueno et al Figure 1A, one of the split light paths is delayed with respect to the other. The amount of delay (e.g. a one-bit delay or less than a one-bit delay) would obviously be chosen by the practitioner in accordance with the particular application in which the wavelength converter is being used.

Claims 4 and 5 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 6,282,015 to Ueno et al, as applied to claims 2 and 3 above, further in view of U.S. Patent 6,646,784 to Leuthold. In the Ueno et al Figure 1A wavelength converter,

the nonlinear portions **24** and **25** are implemented as nonlinear waveguide segments. The use of other nonlinear elements for performing cross-phase modulation in similar optical wavelength converters is well known in the art, however. For instance, Leuthold teaches using semiconductor optical amplifiers for this purpose. The use of semiconductor optical amplifiers as the nonlinear portions **24** and **25** in the Ueno et al Figure 1A wavelength converter would thus have been obvious to the person of ordinary skill in the art.

Claims 6 and 7 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 6,282,015 to Ueno et al, as applied to claims 2 and 3 above, further in view of U.S. Patent 6,515,793 to Edagawa et al. In the Ueno et al Figure 1A wavelength converter, the nonlinear portions **24** and **25** are implemented as nonlinear waveguide segments. The use of other nonlinear elements for performing cross-phase modulation in similar optical wavelength converters is well known in the art, however. For instance, Edagawa et al teaches using electro-absorption modulators for this purpose. The use of electro-absorption modulators as the nonlinear portions **24** and **25** in the Ueno et al Figure 1A wavelength converter would thus have been obvious to the person of ordinary skill in the art.

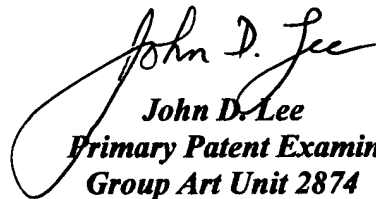
Claims 8, 9, and 11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Ueno et al, the closest prior art document of record, does not disclose or suggest the plural serially arranged phase modulator embodiment set forth in claims 8 and 9. Ueno et al also does not disclose or suggest the

Art Unit: 2874

use of an optical bistable device for generating intensity-modulated light in the manner set forth in claim 11.

All of the prior art documents cited by applicant in the Information Disclosure Statement filed on December 15, 2003, have been considered and made of record. Note the attached initialed copy of form PTO-1449.

Any inquiry concerning the merits of this communication should be directed to Examiner John D. Lee at telephone number (571) 272-2351. The Examiner's normal work schedule is Tuesday through Friday, 6:30 AM to 5:00 PM. Any inquiry of a general or clerical nature (i.e. a request for a missing form or paper, etc.) should be directed to the Technology Center 2800 receptionist at telephone number (571) 272-1562, to the technical support staff supervisor (Team 8) at telephone number (571) 272-1564, or to the Technology Center 2800 Customer Service Office at telephone number (571) 272-1626.

  
**John D. Lee**  
**Primary Patent Examiner**  
**Group Art Unit 2874**